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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/665,489 | 09/22/2003 | Isao Azumi | Q77542 | 6882 |
| 23373 | 7590 | 09/22/2005 | | |
| SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037 | | | EXAMINER CARPIO, IVAN HERNAN | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2841 | |

DATE MAILED: 09/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

10/665,489

Applicant(s)

AZUMI ET AL.

Examiner

Ivan H. Carpio

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date Attch 1 9/22/03
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____

Attch 2 3/68/03
Attch 3 6/28/05

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Urushiwara (US Patent 4893215).

With respect to claim 1 Urushiwara teaches a housing structure (Fig. 1) of vehicle-mounted electronic equipment comprising: a connector housing (Fig. 1, element 10) into which a large number of contact pins (Fig.1, element 17 and column 3, lines 20-23) are press-fitted and a counter-connector is inserted; a cover (Fig.1, element 21) that is integrally formed with said connector housing of a fire retardant resin (column 3, lines 25-27) and is provided with a canopy part (Fig.1, element 21) and an annular circumferential wall part (Fig.1, element 16); an electronic substrate (Fig.1, element 13 and 14 top surface) temporarily fixed onto an inner wall of said annular circumferential wall part, and to which said contact pins are connected; and a highly heat-transfer base (Fig.1, element 13 and 14, below the top surface) that is disposed in contact with said electronic substrate so that a heat generated by the heating part mounted on said electronic substrate is transferred and dissipated (column 2, lines 61-62 Note that aluminum is thermally conductive) wherein said annular

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circumferential wall part is provided with an annular groove (Fig. 3, element 28) in which a sealant (Fig. 3, element 33) is inserted and said base is provided with an annular protrusion (Fig. 3, element 29) snapped into said annular groove. Urushiwara also teaches a fixing screw (Fig. 1, element 25) inserted through screw holes and holding the electronic substrate between the annular circumferential wall part and said base. Urushiwara does not teach plural fixing screws and screw holes but it would have been obvious to one of ordinary skill in the art at the time of the invention to have plural fixing screws and screw holes for the purpose securing the housing at several places assuring a good connection. Urushiwara teaches that the housing structure is to be mounted on an automobile (column 5, lines 31-33) but does not specifically indicate how to mount it, many mounting techniques are well known in the art including mounting lugs. It would have been obvious to one of ordinary skill in the art to use mounting lugs to mount the housing structure taught by Urushiwara to the automobile body because it is well known and manufacture would be relatively simple and known.

With respect to claim 2 and with all the limitations of claim 1, Urushiwara teaches that the electronic substrate is temporarily fixed (Fig. 1 and Fig. 3 Note that element 16 on the right of the substrate is a protrusion) by press-fitting a protrusion part provided on the inner wall of said annular circumferential wall part into a mounting hole (Fig. 3, the hole at the intersection of elements 29 and 13) provided on said electronic substrate.

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Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Urushiwara (US Patent 4893215), in view of Heritier-Best (US Patent 5008643) and further in view of Ohbuchi (US Patent 5719746).

With respect to claim 3 and with all the limitations of claim 1, Urushiwara teaches that the cover integrally formed with said connector housing is composed of polybutyleneterephthalate resin (column 3, lines 25-27). Urushiwara does not teach that the polybutyleneterephthalate is filled with 15-40% by weight glass filler. Heritier-Best teaches polybutyleneterephthalate reinforced with 30% glass fibers. It would have been obvious to one of ordinary skill in the art at the time of the invention to reinforce the cover taught by Urushiwara with 30% glass as taught by Heritier-Best because doing so increases its insulating properties. Urushiwara also does not teach that the sealant is made of room temperature setting silicone rubber. Ohbuchi discloses using room temperature setting silicone rubber as a sealant (column 7, lines 34-37). It would have been obvious to one of ordinary skill in the art at the time of the invention to use room setting silicone rubber, as taught by Ohbuchi, for the sealant, as taught by Urushiwara because when if the electronic substrate were to expand or contract from temperature changes, the silicone rubber sealant would allow for this expansion.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Urushiwara in view of Hara (US 2002/0006742 A1).

With respect to claim 5 and with all the limitations of claim 1, Urushiwara teaches all of the limitations of claim 5 including that a heat transfer protrusion provided on the base (fig.3, element 29). Urushiwara does not teach a copper-foil area that is electrically connected to the heating part mounted on said electronic substrate and disposed on the underside of said electronic substrate; a heat-transfer soft insulating layer that covers said copper-foil area. Hara teaches a substrate (Fig.2, and Fig. 3, element 41) with a copper-foil area (Fig. 3, element 41c) that is electrically connected to the heating part (Fig. 2, element 45. Note Fig. 3 does not show the heating part but it is understood that it is connected) mounted on said electronic substrate and disposed on the underside (Fig. 3, 41c underneath) of said electronic substrate; a heat-transfer soft insulating layer (Fig.3, element 41d and 41b and paragraph [0023]) that covers said copper-foil area. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the electronic substrate taught by Hara in place of the electronic substrate taught by Urushiwara for the purpose of being able to better and faster conduct heat away from the component through the use of the conductive foils in combination with the insulating layer (paragraphs [0022] and [0023]).

With respect to claim 7 and with all the limitations of claim 1, Urushiwara teaches all of the limitations of claim 5 including that a heat transfer protrusion provided on the base (fig.3, element 29). Urushiwara does not teach a copper-foil area that is electrically connected to the heating part mounted on said electronic substrate and disposed on the underside of said electronic substrate; a heat-transfer soft insulating layer that covers said copper-foil area. Hara teaches a substrate (Fig.2, and Fig. 3,

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element 41) with a copper-foil area (Fig. 3, element 41c) that is electrically connected to the heating part (Fig. 2, element 45 Note Fig. 3 does not show the heating part but it is understood that it is connected) mounted on said electronic substrate and disposed on the underside (Fig. 3, 41c underneath) of said electronic substrate; a heat-transfer soft insulating layer composed of heat transfer elastic insulating sheet (Fig.3, element 41b and paragraph [0023]) that covers said copper-foil area. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the electronic substrate taught by Hara in place of the electronic substrate taught by Urushiwara for the purpose of being able to better and faster conduct heat away from the component through the use of the conductive foils in combination with the insulating layer (paragraphs [0022] and [0023]).

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Urushiwara in view of Hara and further in view of Jones (US Patent 6682183).

With respect to claim 6 and with all the limitations of claim 1, Urushiwara teaches all of the limitations of claim 5 including that a heat transfer protrusion provided on the base (fig.3, element 29). Urushiwara does not teach a copper-foil area that is electrically connected to the heating part mounted on said electronic substrate and disposed on the underside of said electronic substrate; a heat-transfer soft insulating layer that covers said copper-foil area. Hara teaches a substrate (Fig.2, and Fig. 3, element 41) with a copper-foil area (Fig. 3, element 41c) that is electrically connected

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to the heating part (Fig. 2, element 45 Note Fig. 3 does not show the heating part but it is understood that it is connected) mounted on said electronic substrate and disposed on the underside (Fig. 3, 41c underneath) of said electronic substrate; a heat-transfer soft insulating layer (Fig.3, element 41d and 41b and paragraph [0023]) that covers said copper-foil area. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the electronic substrate taught by Hara in place of the electronic substrate taught by Urushiwara for the purpose of being able to better and faster conduct heat away from the component through the use of the conductive foils in combination with the insulating layer (paragraphs [0022] and [0023]). Hara does not teach that the insulating layer is a liquid setting silicone rubber filled with heat transfer filler. Jones teaches a silicone rubber filled with heat transfer (column 3, lines 20 – 30). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the silicone rubber taught by Jones as the insulating layer taught by Hara, because of silicone rubbers excellent properties of the high thermal stability and excellent performance in limiting permeation of both air and water (Jones column 3, lines 20-30).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Urushiwara in view of Nishikawa (US Patent 6375477) and further in view of Lindstrand (US Patent 5556055).

With respect to claim 4 and with all the limitations of claim 1, Urushiwara claims all the limitations of claim 4 including that the cover, electronic substrate and base are integrally formed (Fig. 1), a pedestal (Fig.1, element 14) holding an electronic substrate

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(Fig.1, the top surface of element 13 and 14), a column in the canopy of the housing with a screw hole and screw (Fig.1, element 25 and 27) holding the cover, the electronic substrate and the base, together. Urushiwara does not teach a central screw hole with one end blocked, and that central screw hole passes through the pedestal holding the cover, electronic substrate and base together with the screw and that a waterproof sealant is applied to the head of the screw. Nishikawa teaches a central screw hole (Fig. 2, the hold on top of element 16c) with one end blocked, and that central screw hole passes through the pedestal (Fig. 2, element 16c) holding the cover, electronic substrate and base together with the screw (Fig.2, element 17a). Lindstrand teaches applying waterproof glue to a screw (column 4, lines 6-9). It would have been obvious to one of ordinary skill in the art at the time of the invention combine the housing structure taught by Urushiwara with the waterproof sealed screw taught by Lindstrand and the substrate mounting technique taught by Nishiwaka for the purpose of waterproofing any openings in the cover (screw holes) to protect the electronics inside, as well as for the purpose of lifting the substrate off the base giving space the mount other components on the other side of the substrate.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 2003/0086246 a1 discloses a housing structure with a circuit board, US patent 4811165 discloses a substrate with copper foils and pins, US Patent 4585822 discloses liquid silicone that sets at room temperature, US patent 5882954 discloses a insulating film on a substrate.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ivan H. Carpio whose telephone number is 571-272-8396. The examiner can normally be reached on M-R 6:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 571-272-1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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